



Characteristics of the Vegetative Status and Autonomic Regulation in Children with Different Severity of Bronchial Asthma

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ABSTRACT

Background: Disorders of vegetative regulation in asthma relates to both adrenergic and cholinergic link. Maintenance of the vegetative balance in the development of the pathological process allows maintaining the achieved level of compensation to ensure adequate peripheral blood flow and normal bronchial tone.

Objective: To assess the hyper sympathetic reaction in children with bronchial asthma. Methods: Characteristics of vegetative status in adolescents with asthma is evaluated. Further, the structure of the heart rhythm in patients with bronchial asthma depending on the initial vegetative tone in children is characterized.

Results: Patients in this group increased somewhat the share of hyper sympathetic reactive children (30,8% vs 23,1% before treatment; $P < 0.05$), decreased the proportion of sympathoadrenal option (7,69% vs. 23.1% to treatment; $P < 0.01$). Osteosynthesis the CPC remained unchanged and after treatment (7,69%; $P > 0.05$).

Conclusion: Specific therapy of asthma has a positive effect on the performance of the COP only in boys and moderate course of the disease, and in girls and severe course of the disease is broken shifts in the levels of autonomic support of activity remained unchanged.

Key Words: Bronchial asthma, Autonomic regulation, Hyper-sympathicotonia, Helio-geomagnetic, Cephalgia, Cardialgia

INTRODUCTION

The development of exacerbations of asthma in children we observed with most often was due to the influence of cause-significant allergens or respiratory viral infection.¹⁻³ However, 70.4% of children of group 2 (mainly in patients with disease duration from 5 to 10 years or more) occurrence of exacerbations of asthma could be caused by the inhalation of cold air, sharp smells, changes in weather conditions and helio-geomagnetic environment, physical and psycho-emotional loads, which is consistent with the results of studies of several authors.⁴⁻⁶ The occurrence of asthma attack has all seen children of group-2 and 10 (20.8%) children of group-1 was preceded by emotional instability and fatigue, restless sleep, decreased appetite 16 (29.6%) children of group-2 combined with the suspiciousness and the fear of the occurrence of asthma attack.⁷⁻⁹

MATERIALS AND METHODS

Background values ranged IN the children of the 1st group from 24 to 1848 cond. units, and in the 2nd group of 12 to 3023 CONV. units. At the same time, even in the control group of patients with sympathicotonia this parameter did not exceed 408 CONV. Units. In the evaluation of IVT, according to the assessment tables, it was found that among sympathetic of the signs is dominated by anxiety, various options for insomnia, cephalgia, cardialgia short-term pricking character. Parasympathetic signs were submitted marbling of the skin with hyperhidrosis, a tendency to syncope States, dizziness, migraine cephalgia, cardialgia an ischemic origin, disorders of intestinal motility.¹⁰⁻¹²

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RESULTS AND DISCUSSION

Analysis of the parameters KIG showed that patients of the 1st group sympathovagal balance is characterized by a predominance alone the sympathetic division of the ANS in the form of sympathicotonia (45%) or hyper-sympathicotonia (20,8%) compared to the control group (22% and 2.5%).

The number of patients with BA having attounissie balance of the ANS in the 1st and 2nd groups was almost identical (18.0% and 22.2%). However, in patients with a severe course of the process, the background sympathetic tone was significantly less and was noted in 27.8% of cases, with hyper sympathicotonic version of the IVT was only in 18.5% of cases. The vast majority (35.2%) in this group stated the vagotonic direction of IVT. When studying BP, it was discovered that the number of patients with normal reactivity is almost the same in the 1st and 2nd groups (23 (47.9%) and 20 (37.0%)).

However, such a balanced state of sympathetic and parasympathetic departments of VNS in orthostasis decreased in comparison with control 2 times. Patients of the 1st group of the non-adaptive reactions characterized by excessive sympathetic activity in a normal parasympathetic tone of the and, importantly, with sufficient (52.1%) or overweight (37.5%) vegetative coverage. This option characterizes an increased level of autonomic nervous system functioning in the conditions of aggravation of the disease, which can be regarded as the optimal adaptive response in response to hypoxia and an increase in neurohormonal activity (Table 1).

Table 1: Characteristics of vegetative status in adolescents with asthma

Feature vegetative homeostasis	KG (n=40)		group 1 (n=48)		group 2 (n=54)	
	abs	%	abs	%	abs	%
Initial vegetative tonus						
Amphotonic	22	55.0	9	18.8***	12	22.2***
The vagotonia	8	20.0	7	14.6	19	35.2
The sympathicotonia	9	22.5	22	45.8*	15	27.8
Hypersympathicotonia	1	2.5	10	20.8**	10	18.5**
Autonomic reactivity						
Normotonia	28	70.0	23	47.9*	20	37.0***
Asympathicotonia	2	5.0	8	16.7	22	40.7***
Hypersympathicotonia	10	25.0	27	56.3**	12	22.2
Vegetative provision						
Sufficient	26	65.0	25	52.1	19	35.2**
Insufficient	4	10.0	5	10.4	29	53.7***
Excess	10	25.0	18	37.5	6	11.1

Note: the differences about the data of the control group are significant (* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$)

In patients of group 2 BA, autonomic reactivity was characterized by orthostatic instability, hypotension, and prevalence of asympathicotonia (40.7%), which greatly exceeds the frequency of similar reactions in children of the 1st group and in the control group (16.7% and 5.0%, respectively). Individual analysis of the parameters of rhythm variability has shown that normal – hyper sympathicotonic and options of BP in severe BA are accompanied not so much by activation of the sympathetic division as a reduced parasympathetic tone. Vegetative provision of such patients was sufficient only in 32% of cases, which is significantly lower than the control group (70.0%). The main option autonomic imbalance in severe BA was the lack of vegetative provision was observed in half of the surveyed in this group (40.7%). While the recovery period in 72% of cases was lengthened, which is regarded as the exhaustion of the adaptive abilities of the body caused by asthma exacerbation. Important in our view is the fact that among patients with severe asthma is 4 times more likely than patients of the 1st group marked with a combination of asympathicotonic reactivity of the variant with inadequate support activities (53.7% and 10.4%, respectively).

Electrocardiographic changes were characterized by a conduction disturbance in the form of SA block, 2nd-degree atrioventricular block 1st degree, incomplete forms of intraventricular blocks, migration of the pacemaker was varied from 2 to 9%. Isolated right ventricular and supraventricular extrasystoles were detected only in 4 adolescents with Hypersympathicotonia. ECG changes in children of group 2 in the period of exacerbation were more significant, combined, and were characterized by a significant increase in the number of bradyarrhythmias (37.0%), in combination with the migration of the pacemaker (16.0%), violations of repolarization (58.0%). It was demonstrated as twice as often as in children of the 1st group had heart rhythm disorders by type of ventricular extrasystoles (21.0%).

The results of the study of the internal structure of heart rate in patients with BA, we observed depending on the initial autonomic tonus were determined (Table 1) that the structure of cardiac rhythm in patients differs from that of healthy children. So, in patients with initial atonia observed a decrease in the value of Mo ($P < 0.01$), ΔX ($P < 0.01$), the increase in CDF, and IN ($P < 0.05$). It is known that when the source is atonia, there is a definite balance between adrenergic (AMO) and the cholinergic effect (ΔX) on the heart rate. However, patients with initial atonia are out of balance in the direction of increasing humoral regulation (increasing Mo), decreased activity of nervous control (decrease AMO), resulting in reduced relationship AMO/ ΔX and AMO/Mo ($P < 0.05$).

Table 2: The structure of the heart rhythm in patients with bronchial asthma depending on the initial vegetative tonus in children of 2 groups

Indicators heart rhythm	Atonia n = 12	Vagotonia n = 19 of	Sympathico- tonia n = 25
Mo, h.,	0.627±0,008	0.655±0,012	0.546±0,005
AMO,%	14.80±0,22	11.49±0,11***	32.16±0,64***
ΔX, h.,	0.215±0,001	0.378±0,002***	0.093±0,004***
Right, CONV.ed.	8.39±0,22	4.15±0,05***	22.91±0,76***
IN., CONV.ed.	60.42±1,72	21.41±0,78***	374.8±14,90***
AMO/ ΔX	75.09±2,02	311.0±0,74***	388.7±14,19***
AMO/ Mo	24.10±0,66	17.88±0,52***	60.30±1,18***

Note: differences in data atonia significant (*P<0.05, **P<0.01, ***P<0.001)

These shifts in the humoral contour of the cardiac rhythm occur on the background of reducing the activity of the parasympathetic division of the ANS (ΔX; P<0.01) and tension of compensatory mechanisms in the regulation of heart rhythm (increase in CDF and IN; P<0.05).

In patients with BA at the initial vagotonia significant differences in heart rate (ΔX, CDF, IN, AMO/Mo) compared with healthy children (ΔX=0,395±0,020 sec; CDF=3,45±0,12 CONV.ed.; IN=24,8±1,49 CONV.ed.; AMO/Mo=18,8±2,48) not observed (P>0.05) (Table 2). This same group of patients, seal the cardiac cycle (Mo, P<0.001), reducing the value of the AMO (P<0.05) and the ratio AMO/ΔX (P<0.05) in comparison with healthy children (MoE=0,755± 0,02 sec; AMO=14,30±1,02%; AMO/ΔX=39,8±4,38). This data is similar to what happened in the original atonia - the growing influence of humoral contour with a reduction in Central on the heart rate.

In patients with initial sympathicotonia there is a further enhancement of humoral contour (P<0.001), the maximum reduction in ΔX (P<0.01), a significant increase in the CDF and IN (P<0.01) in comparison with healthy children (MoE=0,607±0.06 sec; ΔX=0,16± 0,05 sec; CDF=11,3± 0,43 CONV.ed.; IN=179,70±of 7.05 CONV.ed). It should be noted that the decrease in ΔX to the low values (0,093±0,004 sec) on the background of high rates of VPR, IN indicates a state of extreme tension and deterioration of the quality of regulation of blood circulation - the “emergency” phase in the regulation of heart rhythm. The increase of relations AMO/Mo (P<0.05) and AMO/ΔX (P<0.01) in comparison with healthy children (50,3±2,14 and 28.2±3,1 respectively) indicates a depletion of compensatory abilities of the parasympathetic division of the ANS and the substantial strengthening of the Central (neural) circuits and increase in

the degree of centralization of control heart rhythm.

Thus, regulation of heart rate in patients with asthma depends on the initial autonomic tonus. So, when the original Ato - vagotonia occurs unfavourable changes in the heart rhythm, manifested higher heart rate, less adaptive regulatory mechanisms - the increasing influence of the humoral outline on the background having reduced the influence of the nervous mechanisms and the organization of the heart rhythm. In contrast to patients with EY and vagotonia, sympathicotonia, the original is the depletion of the parasympathetic division of the ANS. A significant strengthening of the nervous regulation of the heart rate indicates the onset of the “emergency” phase of the compensatory capacity of the organism for the promotion and organization of the heart rhythm. Given the evaluation of the initial vegetative tone by index voltage (IN) in conditions of relative rest does not always accurately reflect the true state of the autonomic tone, we have neglected the change of autonomic tone during orthostasis (KIG), which are presented.

As shown by the data in Table 3, the patients with bronchial asthma baseline autonomic tone - atony (SI1=30,0-90,0 CONV.ed.) vagotonia (SI1<30,0 CONV.ed.) relative peace was maintained due to excessive voltage in the parasympathetic division of the ANS. This suggests that 1/2 of children with asthma source Ato - vagotonia had initially dystonic.

In patients with BA at AutoProbe, decreasing values of ΔX and Mo (heart rate quickens) increases the performance of the AMO, the CDF, and derived SI2 AMO, Mo, and ΔX (P<0,05-0,001). While obvious changes are detected in patients with initial Ato and vagotonia than the sympathicotonia, which is consistent with the law of initial values: the lower the initial level of work, the more shifts. This is also confirmed by the marked increase in the ratio SI2/SI1 when atony (6,32±0,59; P<0,01) and vagotonia (7,42± 0,57; P<0,001) than of sympathicotonia (2,47±0,08).

However, the dynamics of the initial vegetative tonus during orthostasis in patients of ATO- (16,5%; P>0.05), Vago- (8,6%; P>0.05) and sympathicotonia (74,7%; P>0.05) not confirmed “ease these two shifts,” according to the specific weight of the initial vegetative tonus during orthostasis before treatment (respectively 15,8; the 3.6 and 80.6%). Therefore, interventions aimed at specific therapies, provide a temporary and unstable effect.

The degree of deviation of the heart rate in patients with BA depends on the initial vegetative tonus when AutoProbe is presented in tables.

Thus, in BA patients, the autonomic reactivity is characterized in 56.1% of cases as hyper sympathicotonic reaction. At the same time, in less favourable conditions the children with initial sympathicotonia. Hyper sympathicotonic reaction in these children is due to a significant increase in the CDF

(39,09 ± 1,64 CONV.ed.; P<0.01), SI2 (804,2±38,2 CONV.ed.; P<0.001) provided less expressed compensatory parasympathetic reactions - low reserves ΔX (-23,5% of base-

line) compared with children with the original Ato- (-41,2%; P<0.01) and vagotonia (-69,6%; P<0.001) (Table 3).

Table 3: Dynamics of structure of heart rate in patients with asthma according to the initial vegetative tonus when AutoProbe

Indicators heart rhythm	Amphotonic		the Vagotonia		The sympathicotonia	
	n = 12	% of shift	n = 19%	% of shift	n = 25 %	% of shift
Mo, h.,	0.535±0.007	-14.7	0.600± 0.21	-8,8	0.456± 0.004	-17.7
AMO,%	25.30± 1.35	+41.2	21.29±1.09	+46.1	4.01± 0.48	+18.6
ΔX, h.,	0.152± 0.009	-41.2	0.223± 0.018	-69.6	0.073± 0.004	-23.5
Right, CONV.ed.	21.60± 1.44	+61.8	13.60± 1.10	+69.6	39.09± 1.64	+41.2
IN., CONV.ed.	382.9±40.9	+84.3	170.9±8.33	+87.3	804.2±38.2	+53.9
AMO/ ΔX	360.6±20.6	+79.4	173.8±8.86	+82.4	783.4±32.4	+41.2
AMO/ Mo	50.96±2.86	+52.9	39.20±1.26	+20.6	88.61±2.07	+31.4
Mo, h.,	6.32±0.59	-	7.42±0.57	-	2.47 ± 0.08	-

These data indicate excessive tension in the sympathetic division of the ANS and the depletion of functions in the parasympathetic division, which indicates the development of a “stage of exhaustion” in the hypothalamic-pituitary and sympathoadrenal system. The normal autonomic response at the level SI2/SI1 in patients with BA simultaneous involvement of the sympathetic and parasympathetic division of the ANS. Hyper sympathicotonic reaction among the surveyed children is achieved by the excessive amplification of the sympathetic division when the failure of adaptation to the load (COP) to the humoral and neural circuit of the Central regulation of heart rhythm. While the parasympathetic division is too depressed: decrease ΔX and increase AMO/ΔH. If we consider that such a response in 49 (62.8 %) of the 78 children at the expense of the cases the original sympathicotonia, it becomes obvious that the perversion or dystonic nature of this shift.

Sick children with asympathicotonic reactions in terms of Mo, ΔX was not statistically different (P>0.05) from those in children with normal autonomic responses. Asympathicotonic reaction in the examined children is characterized by depletion of the sympathetic division of the ANS, as evidenced by the low value of CDF (P<0.05), SI2 (P<0.01) AMO/ΔX, and AMO/Mo (<0,01; P<0,05).

The results of specific therapy of patients with BA has not had any significant changes in the proportion hyper sympathicotonic and normal autonomic reactions, but the proportion of children with asympathicotonic reaction (13,7, compared with 10.1; P<0.05) was slightly increased. The results of the analysis of these reactions, respectively, at the initial vegetative tone (Ato, Vago - and sympathicoto-

nia) showed only an increase in the frequency of children with the normal reaction when atony (55,5% vs 34.4% to treatment) in children with the source of Vago- (27.8 %; P<0.001) and sympathicotonia (15,8%; P<0.01) the proportion of such responses was significantly decreased (respectively, from 48,1% and 28.8%) indicating the failure of the functions of the sympathetic division of the ANS. This is evidenced by a significant decrease in the proportion of children with hyper sympathicotonic reaction when Ato- (37,0%; P<0.01), Vago- (11,1%; P<0.001) and sympathicotonia (52,6%; P<0.05) compared with their frequency before treatment: respectively 46,8%, 51,9% and 61.3%). A significant increase in the proportion of children with asympathicotonic reaction when Ato (33,3%; P<0.01) and sympathicotonia (64,9%; P<0.001) indicating a lack of connection of the sympathetic division of the ANS during orthostasis, further supports the above provision characterizing any “exhaustion” reserve capacity of this division of the ANS or the decrease of sensitivity of the segmental divisions of the ANS (hypothalamus) to external (CPC) factors

As you know, with loads of functional systems of self-regulation hemodynamic parameters are converted to a new, elevated compared with the resting level ⁴. Since the latter is determined by the individual, including the sexual features of neurohumoral mechanisms of regulation of the cardiovascular system, we analyzed the dynamics of indicators wedge-orthostatic tests (CPC) depending on the sex of the patients. The results of COP patients depending on the floor before the start of specific therapy are presented in **Table 4**.

Table 4: Indicators of COP in patients with BA depending on gender (M±M)

Indicators	Boys	Girls	R
I. Source:			
SBP, mm.RT.St.	97.45±2.08	89.56 ± 4.49	<0.05
DBP, mm.RT.St.	64.09±2.07	59.08 ± 3.49	>0.05
Heart rate., beats/min	85.06±3.62	100.64±5.09	<0.01
DP, CONV.ed.	82.93±3.69	90.13 ±5.98	>0.05
II COP			
SBP, %	3.63±0.28	20.92±1.91	<0.001
DBP, %	12.76±0.93	15.44±0.77	<0.05
HR. %	35.74±2.65	21.86±1.66	<0.001
DP, %	23.30±1.52	38.89±3.19	<0.001
AH., mm.RT.St	3.53±0.42	18.31±1.40	<0.001
Heart rate., beats/min	30.44±3.48	22.00±1.16	<0.05
DP, CONV.ed	136.2±10.0	138.9±10.2	>0.05

As can be seen from the data presented in table 4 patients with severe BA source was distinguished by a higher HR value compared to the particular form of the disease ($P<0.01$). Distinctive features of severe asthma from moderate to severe disease - lower gradients %, DBP%, and less pronounced changes in the inotropic reserve of the heart ($P<0.05-0.001$). For the remaining parameters (SBP, DBP, BP, heart rate %, DP %, and % BF) both severities of disease were not significantly different ($P>0.05$).

To study the reactivity of the cardiovascular system in patients with asthma at the levels of heart rate and blood pressure, we determined the time of maximum shear and recovery time these parameters are subject to the fulfilment of a COP.

It should be noted that the main hemodynamic parameter of a COP is to increase heart rate and an SBP inadequate hemodynamic response (increase DBP) on the psycho-emotional load³. Inadequate reaction – a temporary increase in DBP (in growth SBP in healthy children) in patients with BA indicates the presence of pronounced changes in the psycho-emotional sphere. It is known that changes in mental activity are reflected in the ratio of increase in SBP and DBP, and changes in the emotional component - the intensity of growth of these indicators. Given that changes in the psycho-emotional sphere increase the tightness of correlations AH with hormones (aldosterone, ACTH, cortisol) hypothalamic-pituitary-adrenal system^{7,8,9} the obvious fact that “exhaustion” of the functional reserve of a sympathoadrenal and hypothalamic-pituitary-adrenal system in patients with BA. These data require the need for further in-depth study of the psychoemotional sphere of patients and timely correction of their changes.

We have analyzed the dynamics of blood pressure, heart rate in patients with BA, moderate and severe currents of the disease (table 4 and found that the initial heart rate in patients with severe disease higher ($P<0.01$) than in moderate flow, and the level of SBP and DBP both forms of the disease do not differ from each other ($P>0.05$). The increase in heart rate during the performance of COP in both groups is not significantly different ($P>0.05$), making the first minute of the sample, 16.3 and 25.9 % for moderate and 16.2%, and 11.9% in severe asthma. The maximum increase in heart rate in both groups of patients is a 10-minutes sample of 31.3% for moderate and 17.9% in severe disease ($P>0.05$).

Data analysis the table shows that the maximum adaptive changes in the levels of SBP and DBP with a moderate course of BA occur in the first minutes (of 5.98 - 16.2%) and subsequently reduced to the 10th minute of the sample to 8.14% at the level of the SBP and to 0.63% at the level of DBP. In severe asthma, the levels of SBP and DBP in the first few minutes of the sample is a negative phenomenon, i.e. it does not raise levels of SBP and DBP with only 5 - 6 minute and subsequently going on to increase their levels (to 4.54% for the SBP and to 12.8% for DBP). In General, graphs of heart rate, SBP, and DBP at moderate for a BA in the same way as when sympathoadrenal, and severe - osteosynthesis the CPC, which is pathological. Patients with the moderate process in 13.3% of cases in antonaros react excessively (hyper sympathetic reaction), 60.0% of cases - not enough (asympathic reaction) and in 26.7% of cases, a mixed reaction, respectively sympaticoca-but (6,67%) and osteosynthesis options COP (20,0%); in patients with severe asthma increased the proportion of responding COP is redundant.

Gipersimpatikotonii in 25.1% of cases ($P<0.01$), reduced the proportion of the reacting children - 46,2%, hyperventilates - 7.69% and asimptoticheski - 38,5; $P<0.01$).

Among girls with severe pathology of the enlarged share sympathoadrenal CPC (23,1% vs 6,67% in boys; $P<0.01$) and decreased the number of girls with osteosynthesis CPC (7,69% vs. 20,0% in boys; $P<0.01$) (Table 5).

Table 5: Dynamics of heart rate, SBP, and DBP in patients with BA, moderate and severe currents of the disease (M ± M).

Testing SBP DBP	Heart rate	SBP	DBP
I. the Original data of	84.83±2.85 98.66±4.49	95.42±3.47 93.12±3.03	63.72±2.70 60.41±1.73
II. COP: -1 minute	98.60 ±3.70 114.62±4.15	101.00±3.85 95.70±3.03	70.62±2.31 66.25±3.89
2minute	106.82 ±3.85 110.26±4.16	106.00±4.24 87.63±3.46	75.05 ±3.08 59.21 ±4.32

Table 5: (Continued)

Testing SBP DBP	Heart rate	SBP	DBP
3-minute	103.00±3.86 120.19± 3.63	107.08± 3.65 91.49±3.46	74.04 ± 3.81 58.47±3.82
4-minute	104.50± 4.62. 119.84± 4.67	101.02± 4.62 93.86 ± 3.89	67.61± 3.88 65.04 ± 3.80
5-minute	107.21± 3.91 123.60 ± 4.15	98.32± 4.62 95.40± 3.03	71.29± 3.86 68.01 ± 3.79
6-minute	106.21± 3.70 123.51± 3.63	99.20± 3.85 94.24± 3.07	69.61 ± 2.70 65.48± 3.72
7-minute	101.14± 3.47 124.98± 4.67	97.60± 3.85 93.19± 4.76	71.21± 1.93 61.91 ± 3.69
8-minute	107.64± 4.39 125.65± 3.37	99.00± 3.85 94.21± 3.46	68.62± 3.08 66.23 ± 3.46
9-minute	110.82± 3.93 126.04± 5.19	98.47± 4.29 95.05± 3.89	69.76± 3.85 63.08± 3.87
10-minute	111.34± 3.91 126.14± 4.24	103.01± 4.62 97.32± 3.46	63.30± 3.47 68.15± 3.46
III. The recovery period:			
1- minute	88.91± 4.24 101.57± 5.19	99.69 ± 3.03 85.82± 3.07	61.23± 02.70 56.25± 3.46
2-minute	88.15± 3.31 97.85± 4.67	94.01 7± 2.70 90.48± 2.59	60.34± 2.31 57.70± 3.08
3-minute	88.85± 3.54 100.26± 4.67	99.36± 3.97 91.48± 4.32	66.8 7± 3.08 61.25± 3.89
4-minute	83.30± 3.16 99.38± 3.28	98.01 ± 3.08 91.58± 3.46	62.02± 3.68 61.92 ± 3.3

Note: numerator - indicators of moderate severity in the denominator - indicators of a heavy flow

Among girls with severe pathology of the enlarged share sympathoadrenal CPC (23,1% vs 6,67% in boys; $P<0.01$) and decreased the number of girls with osteosynthesis CPC (7,69% vs. 20,0% in boys; $P<0.01$).

Analysis of changes in indicators of COP in patients with BA after the specific treatment depending on age showed that in boys there is a decrease in the initial values of DBP is 5.2 mm of mercury. St. ($P<0.05$), the increases in "dual-work" from $23.5 \pm .1,52$ mm of mercury. St. $32.5 \pm .1,46$ mm. Hg. St. ($P<0.01$). In girls, changes in the indicators of the CPC were to reduce the growth of the SBP by 15.1% ($P<0.01$), PD% 12.3% ($P<0.01$), and inotropic reserve of the heart by 12.3 mm.RT.St. ($P<0.001$). After the therapy of boys increased the proportion of patients reacting to a COP is redundant (hyper sympathotonia) - 29,4% ($P<0.01$), decreased the number of children with sympathomimetics (of 5.88%; $P<0.01$) and osteosynthesis options COP (OF 5.88%; $P<0.05$). The number of children with asympathicotonic response to the COP was slightly increased (52,9%; $P>0.05$).

In girls after treatment only slightly decreased the proportion sympathetic reacting (a 45.5%; $P<0.05$), and at the other COP hyper sympathicotonic (18,2%; $P>0.05$), sympathicoastenic (9,1%; $P>0.05$) and astrosynthesis (18,2%; $P>0.05$) variants positive changes did not happen.

A similar analysis of indicators of COP in patients with moderate and severe BA currents revealed favourable shifts in the first: the lowering of the increment of the SBP of 9.79% ($P<0.01$), DBP by 6.36% ($P<0.05$), increase BP by 13.4% ($P<0.01$) and 6.2 mm Hg.St. ($P<0.01$) and increase in %DP 13.4% ($P<0.05$). At the same time, decreased the number of children reacting asymptomatic 13,5% vs 20,0% before treatment; ($P<0.05$) and increased the number of patients reacting excessively at 20.0% ($P<0.05$), and at the other COP asympathicotonic (60,0%; $P>0.05$), sympathomimetic (6,67%; $P>0.05$) significant changes were not found.

CONCLUSION

In patients with a severe course of BA, any shifts after treatment did not happen, moreover, the growth of the SBP has grown by 6.6% compared to before treatment. Patients in this group increased somewhat the share of hyper sympathicotonic reactive children (30,8% vs 23,1% before treatment; $P<0.05$), decreased the proportion of sympathicoadrenal option (7,69% vs. 23.1% to treatment; $P<0.01$). Osteosynthesis the CPC remained unchanged and after treatment (7,69%; $P>0.05$). From the above data, one gets the impression that the specific therapy of asthma has a positive effect on the performance of the COP only in boys and moderate course of the disease, and in girls and severe course of the disease is broken shifts in the levels of autonomic support of activity remained unchanged. BA patients have features of vegetative homeostasis, which is expressed with high initial sympathicotonia, hyper sympathicotonic vegetative reactivity, and insufficient and mixed forms of the vegetative provision. The study of the internal structure of heart rate and outcomes in patients with BA COP shows "exhaustion" and reserve capacity of sympathoadrenal and hypothalamic-pituitary-adrenal systems. The positive changes in the autonomic homeostasis after specific therapy occurs only in male patients and moderate disease which is not observed in girls and in severe processes. The latter requires further development of methods of asthma treatment in terms of correction of vegetative homeostasis and the use of vegetative preparations.

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